

1. Details of unit revision and its structure

Subject Name	Physics
Course Name	Physics 04 (Physics Part-2, Class XII)
Title	Revision Unit-10: Communication Systems _Study Guide
Pre-requisites	Content of Unit 10: Communication Systems
Objectives	<p>After going through this study guide, the learners will be able to:</p> <ul style="list-style-type: none"> • How to consolidate the unit? • How to prepare notes?
Keywords	Propagation of em waves, Modulation, amplitude modulation

2. Development Team

Role	Name	Affiliation
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Study Guide

Communication Systems

Unit 10

Syllabus

Communication Systems

Chapter 15

elements of a communication system (block diagram) bandwidth of signals (speech, TV and digital data) bandwidth of transmission medium, propagation of electromagnetic waves in the atmosphere, sky and space wave propagation, satellite communication, need for modulation, types of modulation: amplitude modulation, production of amplitude modulated wave, detection of amplitude modulated wave, Internet and mobile phones.

Study the distribution carefully

MODULE WISE DISTRIBUTION OF UNIT SYLLABUS

6 MODULES

Module 1	<ul style="list-style-type: none"> • History of communication • Special vocabulary • Signals and band width
Module 2	<ul style="list-style-type: none"> • Propagation of electromagnetic wave • Ground wave • Sky wave • Space wave • Satellite communication
Module 3	<ul style="list-style-type: none"> • Modulation • Need for modulation

	<ul style="list-style-type: none"> • Types of modulation • Amplitude modulation AM • Frequency modulation FM • Meaning of tuner frequencies 98.3FM
Module 4	<ul style="list-style-type: none"> • Amplitude modulation • Modulation index • Production of amplitude modulated wave • Detection of amplitude modulated wave • Applications of amplitude modulation
Module 5	<ul style="list-style-type: none"> • Short range communications • Increasing the area of influence using antenna • Use in factories, villages, towns for police work • Internet • Internet servers
Module 6	<ul style="list-style-type: none"> • Mobile phones • Mobile towers • 3G,4G,5G • Mobile companies , what do they do?

Read the e content, do not be overwhelmed by the new vocabulary, get acquainted with the module wise distribution of syllabus.

Understand what is meant by signal - analog and digital signal. What kind of signal is audio message, video message, internet communication on mobile phones computers etc.?

There are three main features of communication – Transmitter, communication channel and receiver

Communication systems can be categorised

1. In terms of information source example **audio, video, data**
2. according to mode of transmission –**analog or digital**
3. according to method of transmission – **wired** (two wire communication – microphones and loudspeakers or optical cables) or **wireless** (ground wave, sky wave, space wave)

Since wireless communication is done using electromagnetic waves, we need to know the different ways EM waves travel through the atmosphere. Ground waves, sky waves, space waves and satellite communication make care to match the mode, frequency bands and need of specific frequency band widths.

4. According to the type of modulation

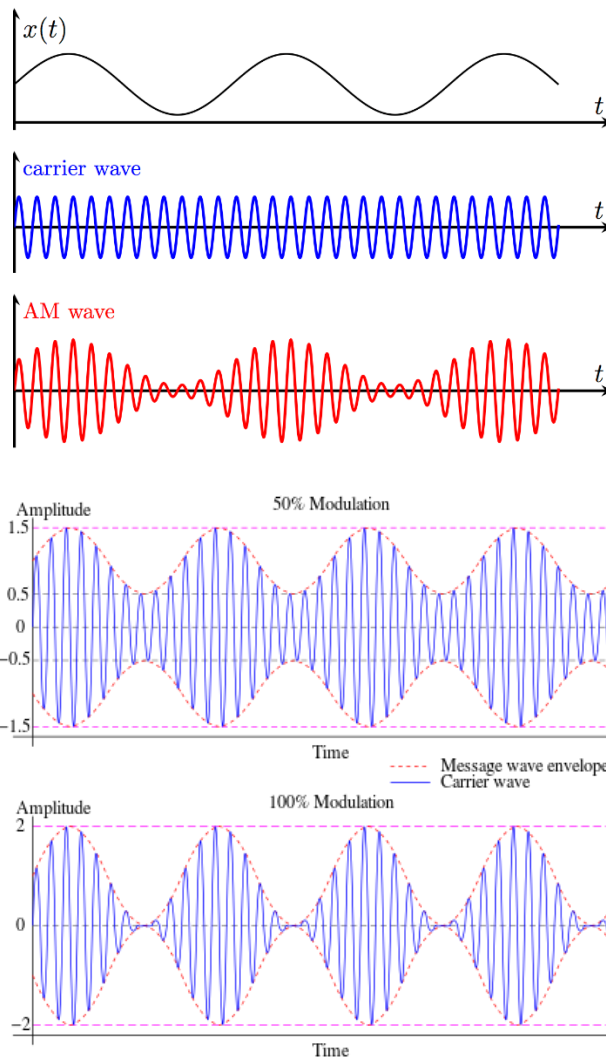
Modulation is required before transmission

Need for modulation

1. Antenna length should be comparable to the wavelength of the signal (at least $\lambda/4$) and the practical difficulty to construct and maintain a large nearly 15 km height of antenna.
2. Effective power radiated by an antenna, the power radiated is inversely proportional to wavelength, meaning power radiated by short wavelength or high frequency signals will be more.
3. Frequency multiplexing –sending different frequencies without mixing

Modulation is done by overlapping a base band signal with a high frequency carrier wave. This can be done in three ways viz. **amplitude modulation, frequency modulation and phase modulation**. You must understand why modulation is a must; **check out the ppt** explaining amplitude modulation. It has simple mathematics to explain band width, modulation index, learn to draw the profile of the amplitude modulated wave.

Learn about the importance of modulation index.



Watch the video link

https://www.youtube.com/watch?v=fGf_ng7qljl

learn about the advantages and disadvantages of amplitude modulation

Draw block diagrams of production of amplitude modulated wave, transmitter of an amplitude modulated wave, receiver for amplitude modulated wave.

Read the e content for meaning and significance of 3 G 4 G and 5 G